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FROM THE EDITORS

THE DIGITAL WORKFORCE AND THE WORKPLACE OF THE FUTURE

Editor's note: This editorial is part of a series written by editors and co-authored with a senior executive, thought leader, or scholar from a different field, to explore new content areas and grand challenges with the goal of expanding the scope, interestingness, and relevance of the work presented in the Academy of Management Journal. *The principle is to use the editorial notes as "stage setters" to open up fresh, new areas of inquiry for management research. GG*

You do not have to look far to find evidence that technology plays a growing role in our lives. In 2015, more than three billion people had access to the Internet worldwide (Internet World Stats, 2015). While that number represents slightly less than half of the world's population, access is more widespread in developed countries, with almost 90% of North Americans having Internet access (Internet World Stats, 2015). Within this context, special attention is being paid to the technology usage of young people. Referred to as "digital natives" (Prensky, 2001), these individuals cannot remember the first time they accessed the Internet. They are completely at home in the world of digital devices and rely heavily on technology for learning, communicating, and entertainment. Within five minutes of waking up, at least 25% of teenagers have reached for a smartphone or other electronic device (Ipsos MediaCT & Wikia, 2013). Tweens (children of ages 8 through 12) average slightly more than four-and-a-half hours of screen media time each day, while teens (ages 13 through 18) average slightly over six-and-a-half hours on screens, and this excludes time spent in school or on homework (Common Sense Media, 2015). Further, many teenagers multitask when using media, monitoring Twitter feeds and SnapChat messages while watching a video on YouTube (Nass, 2013). For many teenagers, technology use is a constant, with 44% reporting that they never fully "unplug" (Ipsos MediaCT & Wikia, 2013).

However, digital natives are not the only heavy users of technology. "Digital immigrants"—adults who have readily adopted technology as it has become available (Prensky, 2001)—are increasingly comfortable with and reliant on technology. For 64% of American adults, smartphones put access to the Internet, email, and social media right at their fingertips (Smith, 2015), and they take full advantage of this access. According to a study conducted by Nokia, the average American smartphone user checks their phone every six and a half minutes, or up to 150 times per day (Spencer, 2013). With this increasing use of technology, major changes have occurred in the way that we live our lives. We are in near constant communication with one another, and our lives are chronicled for friends and followers in real time on social media.

This editorial complements our earlier efforts calling for management research that examines the assumptions and effects of the changing workforce. Our initial focus was on digital technologies as platforms—the editorial on "Managing digital money" opened the discussion on how technology is shaping our fundamental beliefs on the socio-materiality of money, perceptions of value, and its implications for organizations (Dodgson, Gann, Wladwsky-Berger, Sultan, & George, 2015). The subsequent thematic issue on "Information, attention, and decision-making" showcased how digital and mobile technologies are shaping individual behaviors such as creativity, information overload, and employee well-being as well as organizational challenges of managing data pervasiveness and the strategic costs of information (van Knippenberg, Dahlander, Haas, & George, 2015). In "Managing by design," the emphasis was on the principles behind a new workplace experience that called for design thinking and management research on employee experiences, collaborative practices, and the need for sensory and emotional engagement in the workplace (Gruber, Leon, George, & Thompson, 2015). Now, we complete the series with a focus on the individual and how digital natives entering the workforce differ in their expectations of work and work practices, as well as how these differences might influence the future workplace.

In this editorial, we explore the ways that the increasing prevalence of technology influences the way that people approach work. We consider how the competencies developed by digital natives and digital immigrants, referred to as the "digital workforce," may benefit the organizations in which they work and how the increasing use of technology may influence

identity development and patterns of relating within organizations. We also discuss how technology influences the way that work is structured and carried out. Finally, we consider how jobs and organizations might be redesigned to take advantage of the competencies of a digital workforce, to ensure effective communication and collaboration, and to leverage technology while countering its potential downsides. Because digital natives are just starting to enter the workforce and the role of technology in our lives is constantly shifting, we are only beginning to understand the implications for how people approach work and how work could be redesigned.

THE DIGITAL WORKFORCE

Competencies of the Digital Workforce

The digital workforce has developed many competencies in the course of their interactions with technology that may be leveraged at work. Among the most obvious of these competencies is their proficiency and comfort in achieving desired outcomes using technology, often referred to as "digital fluency" (Briggs & Makice, 2012). Digital fluency goes beyond simply knowing how to use a few programs or basic applications. Those who are digitally fluent have achieved a level of proficiency that allows them to manipulate information, construct ideas, and use technology to achieve strategic goals (Hsi, 2007). Although digital natives are often characterized as having high levels of digital fluency simply because of the ubiquitous nature of technology in their lives, it is experience with technology, rather than generational membership, that best predicts digital fluency (Bennett, Maton, & Kervin, 2008; Oblinger & Oblinger, 2005). Thus, both digital natives and digital immigrants may have the digital fluency that is necessary to utilize technology to manipulate data, creatively represent information, solve problems, and design new products and ways of working. Future research is needed to fully understand how digital fluency may influence job performance and career progression across a range of professions.

However, the competencies possessed by a digital workforce go beyond digital fluency. The activities that they engage in provide the opportunities for the development of other skills as well. For example, in his research on how playing online games and interacting in virtual worlds change us, Yee (2014) found that gamers may develop important leadership skills while playing massively multiplayer online role-playing games (MMORPGs) such as *World of Warcraft* or *EverQuest*. While some MMORPGs can be played solo or with computer-simulated teammates, many of the tasks that must be completed in these games require the cooperation of a group of players. In *World of Warcraft*, groups are needed to accomplish tasks such as slaying the dragon or taking on the high-end dungeons, which require 10 to 25 players. These tasks also require a specific combination of roles, making it difficult to quickly form an ad hoc group that possesses the necessary combination of skills. Instead, players strategically form guilds made up of members with complementary skillsets who have some degree of loyalty to one another. Managing a guild entails many of the same challenges as managing work groups. Guilds tend to have high levels of diversity, with players of different ages, backgrounds, and life experiences coming together to complete a task. Completing a task often provides the guild with access to a limited amount of rare loot, which must then be divided among the members of the guild. Managing conflict in the context of high diversity and limited resources is as difficult in an online game as it is in the world of work. Guild leaders in games like *World of Warcraft* explicitly compare their role as guild leaders to real-life managerial roles (Yee, 2014). Research is needed to investigate the degree to which leadership skills developed online transfer to work and to explore the potential of using virtual worlds for leadership development (e.g., Lisk, Kaplancali, & Riggio, 2012).

Online games may also train people to task risks and learn from their mistakes, another competency that is valued in many of today's workplaces (Glen, Suciu, & Baughn, 2014). Games are specifically designed to place obstacles in the path of gamers so that they must fail, learn, and try again. Without this challenge, there would be no point to the game. Thus, gamers are accustomed to learning by trial and error, a technique that is key to design thinking and innovation processes (Brown & Martin, 2015). Survey data reported by Beck and Wade (2004) show that this experience of learning from failure may cause gamers to be more willing to take risks than nongamers, even outside the gaming context. Of course, it is key to remember that games are designed to present players with optimal challenges, matched to their skill level (McGonigal, 2011). Thus, organizations will be able to leverage risk-taking propensities most effectively by ensuring that employees are presented with optimally challenging tasks (Csikszentmihalyi, 1990).

Identity Development and Interpersonal Relating

While the digital workforce clearly brings important competencies to the workplace, the prevalence of technology in employees' lives may also impact identity development and expression, interpersonal relating, and collaborating in ways that have important implications for organizations. Emerging research shows that the increasing use of technology has complex effects on the development and expression of identity. The ubiquitous presence of technology in our lives may limit opportunities to develop deep levels of self-awareness and to behave authentically. Whether waiting in line at the grocery store or for the tip-off at a basketball game, we rarely just wait. Technology provides a welcome distraction during these times, but, without those moments of unscheduled solitude, we may not find the opportunity for reflection that increases our self-awareness (Erikson, 1980; Turkle, 2015). Self-awareness may also become more difficult because of the many opportunities for self-presentation in digital worlds. Whether crafting a text or curating a social media profile, individuals have the opportunity to create an aspirational image rather than presenting an authentic self (Turkle, 2015). Over time, the opportunity to develop multiple identities may obscure people's awareness of who they really are and their ability to act authentically.

On the other hand, although the opportunity to be someone else for a while may draw people to online worlds, they often choose avatars that promote identity development. As Turkle (2015: 84) explained, "When people construct an avatar, they often give it qualities that allow them to express aspects of themselves they would like to explore." Consistent with this idea, Bessière, Seay, and Kiesler (2007) found that the personality traits of the main characters created in *World of Warcraft* were more similar to players' ideal selves than their actual personalities were. In this way, online identities can serve as provisional selves, allowing people to experiment with and elaborate on possible selves that point the way for identity development (Ibarra, 1999). Additionally, Gonzales and Hancock (2011) found that viewing one's own Facebook profile enhances self-esteem, likely due to the selective self-presentation present in most Facebook profiles. However, this effect was dampened for those who also viewed others' Facebook profiles, likely due to a comparison effect. Given the complex association between technology use and identity development, managers and organizations need to consider how to address the possibility of reduced self-awareness and authenticity among members of the digital workforce while also remaining aware of the ways that technology might be used to promote healthy identity development.

The prevalence of technology in our daily lives may also impact the quality of our interactions. In her book *Alone together: Why we expect more from technology and less from each other*, Turkle (2011) observed that the continual presence of technology has changed how we interact with one another and what we expect from our relationships. According to a Gallup poll (Newport, 2014), texting is the most prevalent form of communication for adults under 50, with nearly two-thirds of 18- to 29-year-olds saying that they texted "a lot" on the previous day. Connecting via text is seen as more efficient and allows us to edit and self-present in a way that face-to-face or telephone conversations do not. Perhaps as a result of their reliance on communicating via email or text, employers say that young adults have trouble starting and ending conversations and report that talking on the telephone makes them nervous (Turkle, 2015). This is problematic because face-to-face communication has some advantages over technologically mediated communication. In texts or emails, we lose the ability to ask questions that do not have easy replies, to develop closeness, and to feel known and understood. Even when we are with another person, we may miss out on the benefits of face-to-face conversation because our smartphones are often close at hand, ready to interrupt our conversations with a single buzz. In fact, a new word—"phubbing"—has been added to the dictionary to describe the act of maintaining eye contact while texting (Turkle, 2015). Again, this is problematic because the mere presence of a cell phone during a face-to-face conversation reduces ratings of closeness, trust, and relationship quality, even when the phone is not used during the conversation (Przybylski & Weinstein, 2013).

It is also possible that increased usage of technology is associated with declining levels of empathy. Empathy is most broadly defined as "the reactions of one individual to the observed experiences of another" (Davis, 1983: 113). It includes both a cognitive understanding of the other's perspective and an affective response to the other's experiences. A cross-temporal meta-analysis found that dispositional empathy levels decreased between 1979 and 2009 among college students in the United States (Konrath, O'Brien, & Hsing, 2011). Specifically, empathic concern, or other-oriented

feelings of sympathy (Davis, 1983), decreased by 48% among college students over this time period, and perspective taking, or the tendency to understand others' viewpoints (Davis, 1983), decreased by 34%. Although the study was not designed to examine why empathy is declining, the authors speculated that the increasing use of technology, especially social media, may play a role (Konrath et al., 2011; see also Turkle, 2015). Social media not only encourages a focus on the self by allowing users to document every aspect of their lives, but may also result in more distant interpersonal connections that make it difficult to take another person's perspective or express concern for another's feelings. The kinds of fully present, face-to-face interactions that foster empathy have become less common in a world of digital communication.

However, research has shown that the effects of technology on empathy may be reversible. Uhls and colleagues (2014) studied a group of preteens who attended a camp that prohibited technology, including telephones, computers, and televisions. Without the option to communicate via technology, the campers engaged in increased amounts of in-person interactions. After five days at camp, the preteens' ability to recognize nonverbal emotion cues improved significantly more than that of a matched control group. Although it is not possible to determine the exact cause of this effect, the idea that limiting technology use or increasing in-person connections might increase emotion recognition, a key step in the process to empathic concern, is intriguing. More research is needed to fully understand how digitally mediated communication may influence communication, relationship quality, and empathy, especially in the workplace. Further, as digital natives enter the workforce, research is needed to shed light on the ways in which their experience with technologically mediated communication influences their communication styles, levels of empathic concern, and collaboration preferences.

TECHNOLOGY USAGE AT WORK

Just as increased technology usage has influenced the competencies, self-awareness, and relational expectations of the digital workforce, the way that work is structured and carried out has also been impacted by technological developments. In many ways, these developments have been positive. Employees have a world of information at their fingertips, can collaborate with colleagues across the globe, and can deliver products with increasing capabilities at decreasing costs. For instance, digital knowledge-sharing platforms have become ubiquitous within organizations, and have become central to problem solving in multi-location, geographically dispersed offices (e.g., Haas, Criscuolo, & George, 2015). However, the increasing use of technology also presents challenges. Much recent research has focused on the challenges presented by email and other information and communication technologies. In a study of escalation engineers, technology writers, and marketing personnel at a technology company, Barley, Meyerson, and Grodal (2011) found that employees who spend more time processing email perceived higher levels of overload at work. Because email is set up such that unread messages are retained in an inbox and responses can be sent at any time of day, email backlogs were common. Employees felt normative pressure to avoid an email backlog because they did not want to appear unresponsive or miss important information. Thus, email has become a cultural symbol of excessive work demands. Further, with the continuous interruptions that come via email, people may have a difficult time focusing their attention on complex problem-solving or creative idea-generation tasks (Jackson, Dawson, & Wilson, 2001). While the productivity and well-being benefits of being fully immersed in an activity are well established (Csikszentmihalyi, 1990), achieving flow may be difficult in a technologically connected workspace.

Additionally, technology has blurred the lines between work and nonwork domains (Ramarajan & Reid, 2013; Reyt & Wiesenfeld, 2015). While email, the Internet, and even social media are integral tools for doing work, they also provide easy access to family, friends, online shopping, and other nonwork purposes while at work. Almost all employees (83%) admit to using technology at work for personal use (Cisco, 2008); however, it is when this usage diverts employee attention in a way that reduces productivity or introduces security risks that organizations become concerned (Stanko & Beckman, 2015). Further, technology makes it possible for employees to remain connected to work when they are at home (Boswell & Olson-Buchanan, 2007; Perlow, 2012). Being able to respond to email from the stands of a little league baseball game can provide much-needed flexibility for employees; however, responding to emails during nonwork hours reduces the opportunity for psychological detachment, relaxation, and recovery (Sonnentag, Binnewies, & Mojza, 2008), and ultimately may lead to a norm of constant

connectivity that reduces the sense of autonomy (Mazmanian, Orlikowski, & Yates, 2013). In a study of the daily intrusions of email in nonworking hours, Butts, Becker, and Boswell (2015) found that time required to respond to email outside of work was associated with higher levels of anger, which in turn led to increased work–family conflict.

Given what we know about the characteristics of the digital workforce and the increasing use of technology at work, the question remains regarding how organizations can most effectively manage the digital workforce and leverage technology while avoiding potential downsides. Research has only begun to provide guidance on these issues. In the next section, we consider ways in which work might be redesigned and coordinated to take advantage of the competencies of a digital workforce, to promote effect communication and collaboration, and to ensure that technology is most effectively used as a tool in service of the organization's goals.

REDESIGNING WORK FOR A DIGITAL WORKFORCE

Leveraging Competencies and Motivations

With the increasing prevalence of technology in everyday life, even entry-level workers may join the workforce with high levels of digital fluency. This competency can be valuable to organizations in a number of different ways. The digital workforce will likely be comfortable with technology-based instruction (Kraiger & Ford, 2006), giving organizations a low-cost, replicable solution for helping employees develop the skills that they need. As it becomes less common for teams to be co-located, organizations need employees who are proficient in using virtual collaboration tools, such as Google Drive for collaborative writing, Trello for collaborative project management, and Yammer or Slack for communication and enterprise-level social networking. Further, with more organizations using firm-generated social media content to connect with customers and build their brands, employees who understand and can leverage the power of social media will also be valuable to organizations (Kumar, Bezawada, Rishika, Janakiraman, & Kannan, 2016). Along with the entry of digital natives into the workforce, improvements in health care and longevity have allowed individuals to work longer, creating an aging workforce in many countries of the developed world (Kulik, Ryan, Harper, & George, 2014). Given that the digital workforce will share the workplace with an older cohort of co-workers less comfortable with technology, organizations will also need to reconcile the conflicts that may arise as these groups collaborate. Research is needed to determine how to design jobs in ways that best leverage digital fluency and to explore how variance in digital fluency impacts conflict and collaboration in diverse groups.

In addition to bringing high levels of digital fluency to the workplace, the digital workforce may respond well to motivation strategies that are similar to those used in virtual worlds. In fact, "gamification"—the application of game design principles in other contexts (Robson, Plangger, Kietzmann, McCarthy, & Pitt, 2015)—has already become a popular strategy for increasing employee motivation in business organizations (Gartner, 2011). In her book, *Reality is broken: Why games make us better and how they can change the world*, McGonigal (2011) suggested that organizations might be wise to consider how online games motivate us by providing clear goals and real-time feedback that helps us track progress toward our goals. In addition, current models of gamification are built around the principles of providing the right level of challenge and rewarding people frequently for achieving goals. These strategies are consistent with current motivation theories (Hackman & Oldham, 1980; Locke & Latham, 2002), but more research is needed to examine how the design and implementation of gamification systems impact motivation, especially over the long term. Further, it is possible that applications of gamification could be refined to focus on fulfilling employees' individualized needs. Online game players have been found to differ from one another in their motivations for playing online games, with some striving for achievement, others for social connection, and others for immersion (Yee, 2006). As a result, games are designed to allow players to customize the experience to best meet their needs. It is possible that gamification within business organizations could be similarly customizable to allow employees to craft their work experiences in ways that are consistent with their individualized needs.

Encouraging Mindful Usage

Organizations may also consider how to encourage mindful usage of technology in ways that promote time for focused thinking, opportunities for recovery, and effective collaboration. For example, some organizations are experimenting with technology-free meetings (De Vita, 2015) in the hope that reduced

multitasking will make meetings more efficient. Similarly, some organizations are reducing their reliance on email, encouraging more face-to-face communication (Burkus, 2016) in an attempt to increase the efficiency of problem solving and decision making. This solution, with its opportunities for more direct communication, may also have the benefit of increasing empathy, as compared to technologically mediated communication methods (Uhls et al., 2014). Additionally, employees who are responsible for idea generation or complex problem solving may see increases in their effectiveness if they schedule periods of work that are uninterrupted by email or other technological intrusions (Sykes, 2011). Finally, as we noted above, technologically mediated communications not only interrupt employees during the workday, but also follow people home at night, increasing perceptions of stress (Barley et al., 2011), anger, and work–family conflict (Butts et al., 2015). To help employees find time for recovery and reduce work–life conflict, organizations such as the Boston Consulting Group have experimented with giving employees a smartphone-free night during the week (Perlow, 2012). This may enable employees to connect with their families and truly recover from the stresses of the day (Sonnentag et al., 2008).

Research is needed not only to determine how more mindful usage of technology influences employee engagement and effectiveness, but also to determine how to most effectively create norms around these practices. Practices such as continually checking email at work and at home have become ingrained habits for many people, making it difficult to reverse this trend. While it is possible that individuals can be conditioned to use technology more consciously, it is likely that additional changes may be needed to change our technology usage patterns. Some of these changes may come in the design of the technology itself. Technological features influence the ways in which we interact with technology. For example, messaging software that is a part of project management systems sorts and manages messages differently than email, allowing people to review messages associated with a single project as needed and separately from the general stream of communication. This technological design feature naturally influences how messaging is used and its impact on employees. However, while policies and technological features may influence technology usage patterns, employees' behavior within a situated context is also likely shaped by situational controls and local norms regarding technology usage. In a qualitative study of the U.S. Navy, Stanko and Beckman (2015) found that multiple strategies were required to ensure that employees used technology mindfully. Both global and situational controls were used to monitor technology usage, remind people of appropriate usage practices, and limit technology usage in an effort to manage employee attention, reduce the potential for the sharing of sensitive information, and prevent information-technology security breaches. It is also important to recognize that the most effective way to use technology may vary from person to person. As Mazmanian (2013) found in her ethnography of the introduction of Blackberries at a footwear manufacturer, one employee group developed communication norms that avoided the pressure for constant connectivity while also recognizing that different members of the group would use the new technology differently. Understanding how to encourage this shared understanding of heterogeneous communication practices may be especially important as digital natives—with their own ingrained habits of technology usage—enter the workforce. Future research is needed to expand our understanding of how social controls work in concert with technological features and organizational policies to influence the ways in which we use technology mindfully.

Technological Advances in Virtual Collaborations

Finally, a digital workforce may develop new ways of working that leverage the full capabilities of technology. Without question, technology is prevalent in today's workplace. However, in many cases, only a fraction of its potential is being utilized. Currently, virtual meetings likely involve bringing video feeds or avatars of all team members together in a virtual room and providing all team members access to a shared workspace, but technology allows us to do much more. For example, Yee (2014) has suggested the possibility of having team members represented by avatars that grow in size based on the quantity of their participation or fade away as they remain silent. This visual reminder of unequal participation rates takes advantage of a technological solution to help change behaviors in teams that are concerned about making sure that the points of view of all members can be heard.

In fact, technological advances may provide solutions to the very problems that have arisen with increased technology usage. Globalization and alternative work arrangements have led to increasing usage of virtual teams, but virtuality can make coordination across team members challenging and

may lead to reduced effectiveness unless virtual teams are managed appropriately (Gilson, Maynard, Young, Vartiainen, & Hakonen, 2015). To that end, virtual teams are increasingly using advanced technological solutions that facilitate collaboration, communication, and document sharing (Gilson et al., 2015); however, the use of even more immersive technologies may help virtual teams members increase their presence, or the psychological experience of "being there" (Cummings & Bailenson, 2015). Three-dimensional virtual environments or virtual reality headsets help users block out the external environment and reduce the perceived distance between users. With a three-dimensional video camera, the background can be removed from the video feed, allowing the video of a person at another location to float above your computer's workspace and point to content on your screen. Virtual reality systems can go a step further, providing the opportunity to bring up a web site or three-dimensional prototype inside the shared virtual space where all participants can work on it together (Mims, 2015). As these technologies continue to develop, the potential for rich interactions for virtual teams becomes more and more likely, and the meaning of presence may start to shift from physically being there to the psychological experience of being there. Research examining how these more immersive technologies may be used in virtual business teams will be needed as these technologies become more prevalent in the workplace. These are only a few examples of the ways in which workplaces may be redesigned to leverage the potential of the digital workforce and to mindfully utilize technology in ways that minimize its downsides.

A PROMISING RESEARCH AGENDA

We are at the beginning of an exciting transformation of work, work practices, and workplaces. The digital competencies of the workforce and the ways in which technology are used in the workplace will continue to develop and change. This provides organizations and managers with a wealth of possibilities for increasing organizational effectiveness. At the intersection of the capabilities of the digital workforce and the power of technological advancements such as artificial intelligence lie opportunities for radical organizational change. However, it is important to also recognize the downsides of burgeoning technology usage for concentrated work, close relationships, and effective collaboration. Research is needed not only to examine the effects of the growing use of technology by a digital workforce, but also to provide guidance about how best to utilize technology in the service of organizational goals. We encourage management scholars to delve deeper into the world of digital natives in order to guide the nature of future work itself.

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